Elytra, *Tokyo*, **34**(2): 257–266, November 18, 2006

Two New Cave Trechines of the Genus *Sichuanotrechus* (Coleoptera, Trechinae), with Notes on its Type Species

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Abstract Two new trechine species of the genus *Sichuanotrechus* are described from two limestone caves to the south-southwest of the known localities of the type species. They are externally very similar to the latter but definitely different in configuration of the aedeagal apical part. The new names given are *Sichuanotrechus albidraconis* S. Uéno and *S. rhinoceros* S. Uéno.

The trechine genus *Sichuanotrechus* was recently erected by Deuve (2005, p. 6) for an anophthalmic cave species found in a limestone cave located about 150 km north-northeast of Chengdu (not "au nord-ouest" though so-described in Deuve's account). The limestone area containing the cave under consideration lies near the southwestern end of the Longmen Shan Hills stretching to the west of the Daba Shan Mountains. Caves of the latter mountain range were investigated before 2005 on both the Sichuan and Shaanxi sides, but cave trechines were found only from two caves of Shennongjia at the easternmost part of the Dabas (Uéno, 2002, 2005). Then I planned to visit the Longmens, since "Ape King Cave" was already well known as a centre of tourism. The idea was realized early in the summer of this year after a trip to the southwestern corner of Guizhou.

Arriving at "Ape King Cave" located in the southwestern part of the Longmen Hills, we soon found that we were too conservative in estimating the number of extant caves in that area. Actually, there are so many caves in the limestone area covering several provinces that many more days than we had expected were needed for making satisfactory cave investigations. Besides, cave animals were by no means abundant, probably because of dried condition prevalent in larger caves. After all, we were able to explore only eight caves in two drainage systems and to collect eyeless trechines in four of them. All the specimens obtained were found to belong to *Sichuanotrechus,* and though all of them are closely similar to one another in external morphology, careful study of male genitalia proved that they were classified into three species; one of them, doubtless identified with Deuve's species, occurs in the caves of the Pingtong He drainage and the other two, both apparently new to science, in the caves of the Tongkou He drainage.

In the present paper, the new species will be described and some additional accounts will be given to ameliorate DEUVE's account of *Sichuanotrechus wani.* The abbreviations used herein are the same as those explained in previous papers of mine.

Before goind into further details, I wish to thank Ms. Rie OSHITANI and Mr. Masaki NAKANISHI of the Ritsumeikan University Explorers Club for rendering invaluable help in my researches. Hearty thanks are also due to Mr. FAN Ting of the Academia Sinica for his unfailing support in arranging our cave explorations.

Sichuanotrechus wani DEUVE, 2005

(Figs. 1–2)

Sichuanotrechus wani DEUVE, 2005, Revue fr. Ent., (N.S.), **27**, p. 6, figs. 1, 7, p. 57, fig. 1; type locality: grotte "Yuan Dong," environs de Ganxi.

Length: 5.15–5.25 mm (from apical margin of clypeus to apices of elytra).

Since this species was carefully described by DEUVE, it does not seem necessary to make comments on his account. However, the single male then known was teneral, so that the coloration in mature condition should be described in place of the teneral one. Standard ratios are added to the original description, and position of the setiferous dorsal pores on the elytra is examined from different aspect. Besides, the male genitalia in mature specimens are fully redescribed so as to facilitate identification.

Colour wholly reddish brown to somewhat darker reddish brown, shiny and not iridescent. Microsculpture clearly impressed on head, mostly consisting of fine transverse lines though partially of polygonal meshes; largely obliterated on pronotum and elytra, though vestige of fine transverse lines is patially perceptible. Pronotum elongated subcordate, usually widest at about five-eighths from base or a little behind that level, and lightly contracted posteriad; base slightly wider than apex; PW/HW 1.23–1.31 (M 1.27), PW/PL 0.90–0.94 (M 0.91) [PL/PW 1.07–1.11 (M 1.10)], PW/PA ca. 1.49–1.60 (M ca. 1.54), PW/PB 1.39–1.44 (M 1.42), PB/PA ca. 1.07–1.13 (M ca. 1.08). Elytra oblong-ovate, widest at a level between basal two-fifths and the middle; EW/PW 1.75–1.78 (M 1.77), EL/PL 2.70–2.95 (M 2.82), EL/EW 1.70–1.78 (M 1.75); setiferous dorsal pores always located at the anastomoses of two striae, the anterior one on the anastomosis of striae 3 and 4 at about 1/6 from base, and the posterior one on the anastomosis of striae 4 and 5 at about 4/7 from base; preapical pore located at the apical anastomosis of striae 2 and 3 as usual.

Male genital organ small though rather heavily sclerotized. Aedeagus about three-tenths as long as elytra, slender, tubular, nearly parallel-sided in dorsal view, gently arcuate before middle in lateral view; basal part rather strongly curved ventrad, with small basal orifice, whose sides are very slightly emarginate; sagittal aileron large though hyaline; viewed laterally, apical part gradually and straightly tapered to pointed extremity; viewed dorsally, apical part gently convex to the right, longitudinally open on dorsum, forming a peculiar window surrounded by thickened lateral parts, with short broad apical lobe, whose tip is subtruncated and rounded at the sides; apical orifice open at the proximal part of the longitudinal window; ventral margin nearly straight behind middle in profile. Inner sac mostly covered with poorly sclerotized aciculae though with elongate scales at the proximal part; no differentiated copulatory piece. Styles narrow at the apical parts, left style longer than the right, each bearing three or four apical setae, the ventral one of which is shorter than the other three when that style is quadrisetose.

Specimens examined. 1♂, Yuanwang Dong, 1,050 m alt., Yongcheng Cun, Guixi Xiang, Beichuan Xian, NE. Sichuan, Southwest China, 2–VI–2006, S. UÉNO leg.; 1♂, 2♀♀, Liangshui Dong, 650 m alt., Jinbao Cun, Guixi Xiang, Beichuan Xian, NE. Sichuan, 2–VI–2006, S. UÉNO & R. OSHITANI leg. (All in NSMT).

Notes. This interesting species was described from "Yuan Dong (env. 1400 mètres)" near the village Ganxi (now contained in the village Guixi), but we were unable to locate a cave with this name. No local people knew "Yuan Dong," which probably means "ape cave" in Chinese. Professor WAN Xinnan, who organized the 6^e^ expédition en Chine de l'Aventures Karstiques Lointaines, in which participated Fanny SCHALK, the collector of the type specimen, suggested that the cave "près du village de Ganxi, sur la rive droite de la vallée, en face du complexe touristique de 《Ape King Cave》," must be "Yu Dong" (meaning fish cave) at Shawo Cun of Guixi Xiang. We went to examine this cave, but failed in exploring its inner part because of the high water level at the bottom of the large entrance room, and in taking the trechine beetle. Besides, Yu Dong is open at an elevation of only 650 m, much lower than "env. 1400 mètres" indicated by SCHALK.

Fortunately, however, we were able to take *Sichuanotrechus* in the two caves Yuanwang Dong and Liangshui Dong, both lying on the same slope of Jiuhuang Shan though at very different levels. They neatly agree with the original description in both external and genitalic characteristics. The additional accounts given above are based on these fresh specimens.

Yuanwang Dong (=Ape King Cave) is a show cave opening under a large cliff at a higher part of the very steep slope, whereas Liangshui Dong is located just above the Pingtong He River. The single Yuanwang Dong specimen was found near the innermost of the cave from beneath a small heap of gravel along a trickling water. The Liangshui Dong specimens were taken near the edge of a shallow pool of underground water at the lowest part of the cave. They were found either running on a large stone or dug out from beneath a large stone embedded at the water edge.

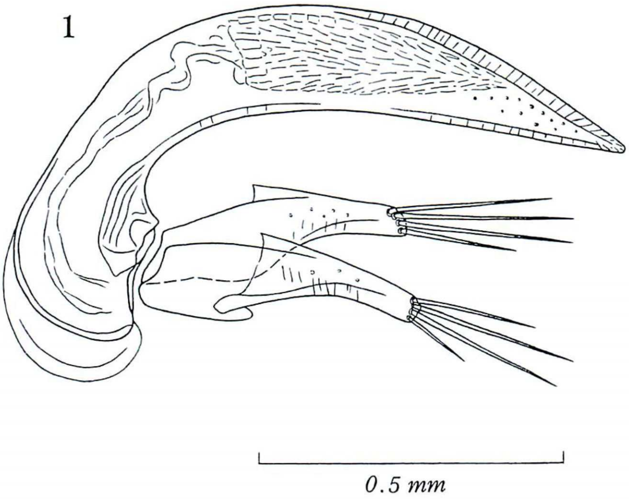
Sichuanotrechus albidraconis S. UÉNO, sp. nov.

(Figs. 3–4, 7)

Length: 5.05–5.70 mm (from apical margin of clypeus to apices of elytra).

Very closely similar in external morphology to *S. wani,* only differing in the shape of pronotum, which is less contracted posteriad and is wider at base. Colour as in *S. wani.*

1



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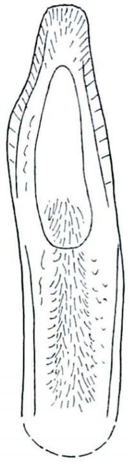
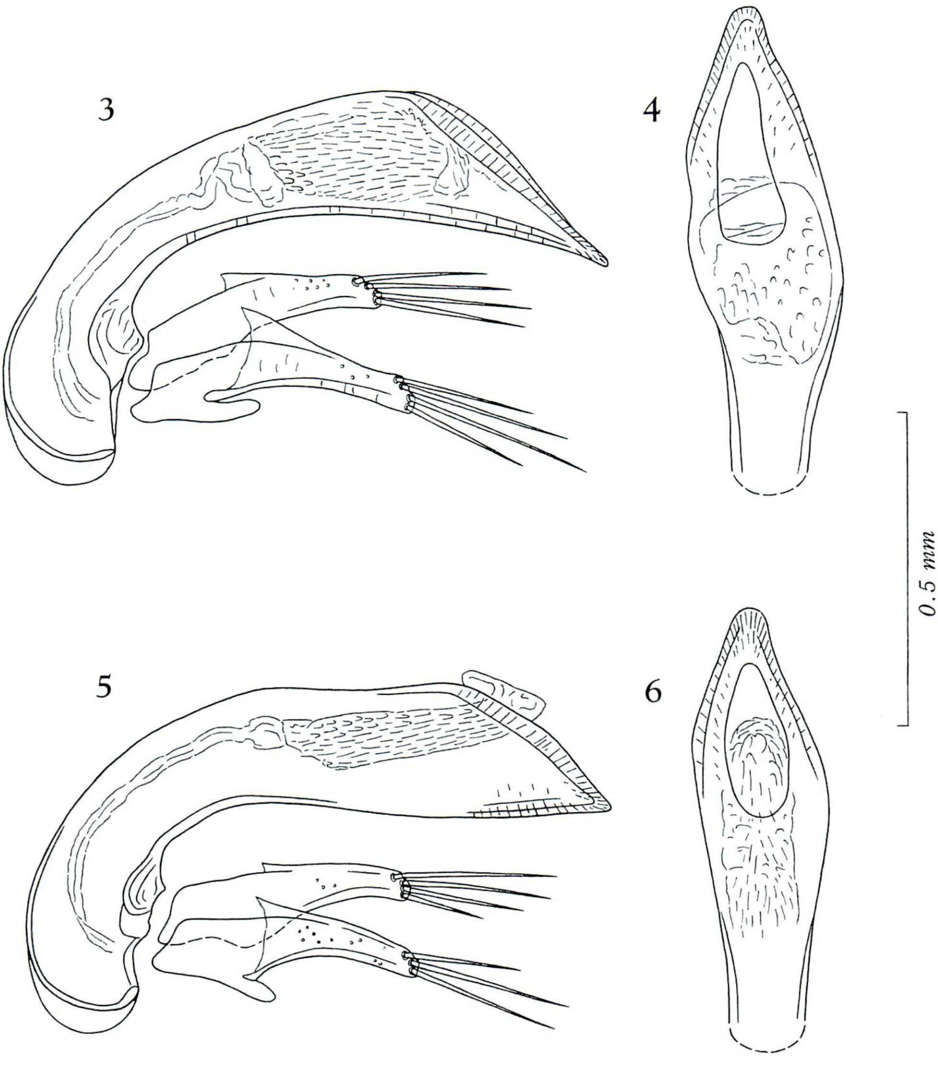


Head as in *S. wani,* fairly large, widest between the levels of supraorbital pores; dorsum depressed, with deep entire frontal furrows gently arcuate from clypeus to neck constriction; eyes evanescent in mature condition; genae gently and evenly convex, with several short hairs; neck wide, with the anterior constriction clearly marked; mandibles relatively short, lightly incurved at the apical parts and acute at apices; antennae slender, filiform, reaching apical two-fifths of elytra, pedicel a little shorter than scape, about three-fifths as long as antennomere 3 or 4, and about as long as antennomere 10, antennomeres 5–10 gradually decreasing in length towards apex, subcylindrical, 6–8 each a little more than 5.5 times as long as wide, terminal antennomere about as long as antennomere 7, much narrower than scape.

Pronotum a little broader in basal half than in *S. wani,* widest at a level between five-eighths and five-sevenths from base, and less contracted posteriorly; PW/HW 1.28–1.29 (M 1.28), PW/PL 0.92 [PL/PW 1.08], PW/PA ca. 1.48–1.51 (M ca. 1.50), PW/PB 1.33–1.35 (M 1.34); sides rather widely reflexed except near front angles, more widely arcuate than in *S. wani* from front angles to ante-basal sinuation which is situated at about basal ninth and is clearly marked, with two pair of marginal setae, the anterior one before the widest part and the posterior just before hind angles; apex distinctly narrower than base, PB/PA ca. 1.10–1.14 (M ca. 1.12), either straight or very slightly emarginate, with front angles narrowly rounded and hardly advanced; base nearly straight at middle and somewhat oblique on each side inside hind angle, which is small but laterally protrudent; dorsum gently convex, with distinct median line reaching base but not extending to apex; basal transverse impression narrow and more or less uneven, laterally reaching the bottom of basal foveae, which extend anteriorly along side borders; basal area narrow and more or less uneven, usually notched along basal margin.



Figs. 1–6. Male genitalia of *Sichuanotrechus* spp.; left lateral view (1, 3, 5), and apical part of aedeagus, dorso-apical view (2, 4, 6). —— 1–2 (on p. 260). *S. wani* DEUVE, from Yuanwang Dong Cave at Yongcheng Cun. —— 3–4. *S. albidraconis* S. UÉNO, sp. nov., from Bailong Gong Cave at Xiangshi Cun. —— 5–6. *S. rhinoceros* S. UÉNO, sp. nov., from Xiniu Dong Cave at Tongquan Cun.

Lateral expansion of propleura not visible from above.

Elytra as in *S. wani,* but the bases are more transverse and the striae are a little more deeply impressed and more coarsely punctate, widest at a level between basal third and two-fifths, and obviously more pointed at apices than at bases; EW/PW 1.74–1.77

(M 1.76), EL/PL 2.73–3.01 (M 2.87), EL/EW 1.70–1.76 (M 1.72); shoulders distinct though rounded, prehumeral borders feebly arcuate, not so oblique, marginal gutter recurved at the anteriormost part and extending to the base of stria 2; sides neither serrulate nor ciliated, narrowly bordered except in humeral parts, nearly straight just behind shoulders, then feebly arcuate to before apices, which are rather narrowly rounded, preapical emargination very slight; dorsum moderately convex, steeply declivous at the sides but gently so in apical areas; basal areas transversely depressed; striae entire, deeply impressed throughout and coarsely punctate, stria 8 also entire, not particularly deepened in apical part; scutellar striole very short though distinct; apical striole short but deeply impressed, moderately arcuate, and usually incurved at the anterior part, either joining or almost joining stria 4 or 7; intervals slightly convex on the disc, apical carina obtuse; setiferous dorsal pores and preapical pore as in *S. wani,* always located on anastomoses of two striae, anterior dorsal pore at 1/7–1/6 from base, posterior dorsal pore at about middle, preapical pore located at the level of the terminus of apical striole, and twice more distant from apex than from suture; marginal umbilicate pores identical in arrangement with those in *S. wani.*

Ventral surface smooth; ventrites each with two pair of paramedian setae and several hairs in the same row; anal ventrite with a pair of marginal setae in ♂, with two pair of them in ♀. Legs fairly long and slender, protibiae straight, glabrous on the anterior face, and finely grooved on the external face; metatibiae about three-fifths as long as elytra, and slightly outcurved in apical third; tarsi thin, mesotarsi about five-sevenths as long as mesotibiae, metatarsi about four-fifths as long as metatibiae, tarsomere 1 longer than tarsomeres 2–4 combined in mesotarsi, about as long as that in metatarsi; in ♂, protarsomeres 1 and 2 widely dilated, stoutly produced inwards at apices, and furnished beneath with adhesive appendages.

Male genital organ strikingly different in configuration from that of *S. wani,* though basically identical with the latter in conformation, particularly in the presence of peculiar window on dorsum of the apical part. Aedeagus about three-tenths as long as elytra, tubular and gently arcuate before middle, but dilated posteriorly into a uniquely formed apical part; basal part as in *S. wani,* though bearing a narrower sagittal aileron; viewed laterally, aedeagus highest at the proximal end of longitudinal window, then rapidly tapered to pointed extremity; viewed dorsally, aedeagus abruptly widened behind middle into a broad apical part inclined to the right, and rather widely open on dorsum, with lateral parts heavily and widely thickened; apical lobe short and broad though gradually narrowed towards rather narrowly rounded extremity; in profile, ventral margin lightly emarginate before middle but nearly straight in apical half. Inner sac shorter and broader than in *S. wani,* though similarly covered with poorly sclerotized scales and aciculae. Styles as in *S. wani,* each bearing four apical setae.

Type series. Holotype: ♂, allotype: ♀, 3–VI–2006, S. UÉNO leg. Paratype: 1♂, 3–VI–2006, M. NAKANISHI leg. All deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Limestone cave called Bailong Gong, 650 m in altitude, at Xiangshi

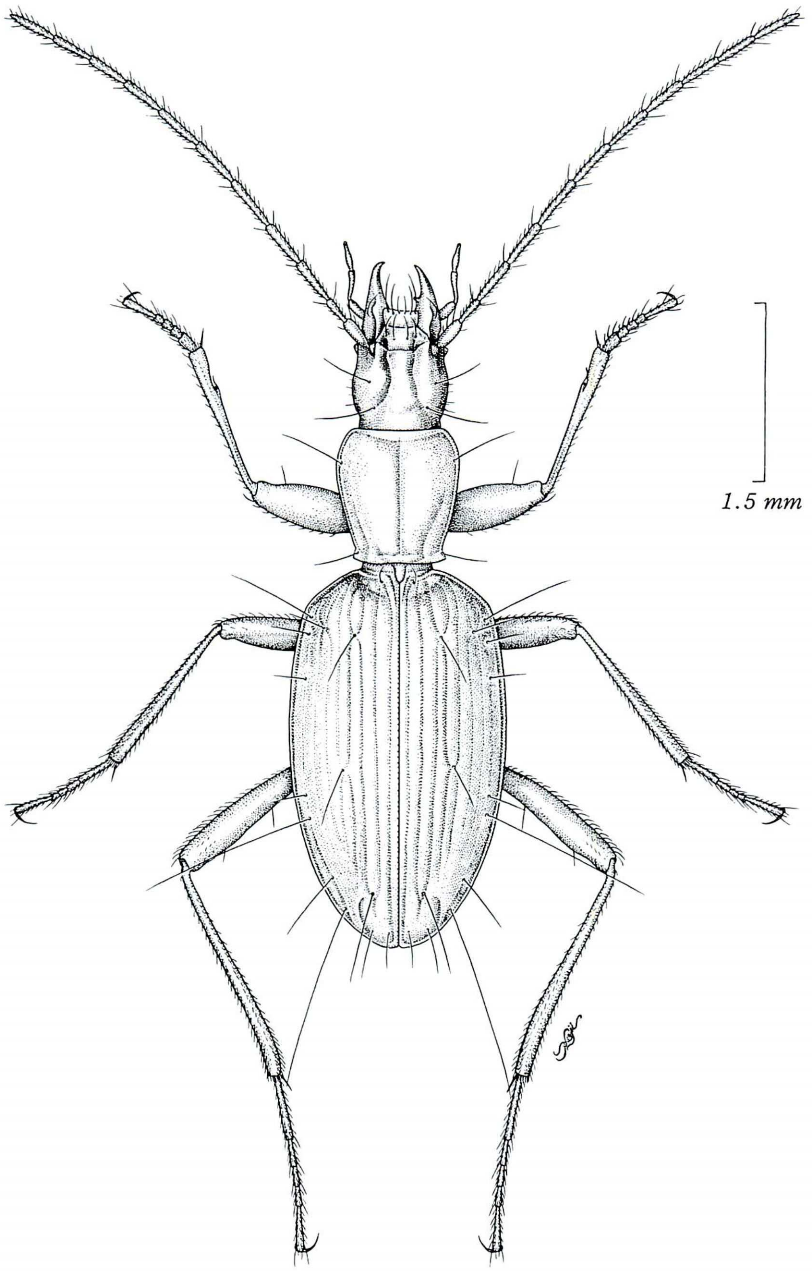


Fig. 7. *Sichuanotrechus albidraconis* S. UÉNO, sp. nov., ♂, from Bailong Gong Cave at Xiangshi Cun.

Cun of Hanzeng Zhen in Jiang'you Shi, northeastern Sichuan, Southwest China.

Notes. It is most unexpected that the present species is so strikingly different from *S. wani* in the shape of the male genitalia in spite of very close similarity in external morphology. Its locality is only about 15 km distant to the southwest in a beeline from that of *S. wani,* though belonging to a different drainage area. Since a close relative of this species, to be described on the following pages under the name *S. rhinoceros,* also occurs in the same valley, major differentiation of the members of *Sichuanotrechus* may have taken place between the two drainage systems, the Pingtong He and the Tongkou He. Further cave explorations are needed for clarifying exact distributional patterns of the two lineages of *Sichuanotrechus,* though it is not easy to follow up the study since trechine beetles of this genus are by no means common.

Bailong Gong, the type locality of *S. albidraconis,* is a show cave belonging to a temple bearing the same name built on the hillside looking down a deep wide valley. From the back of the temple, the cave gradually ascends to a small underground lake, so that the passages are very humid everywhere. Unfortunately, they were mostly paved with cement, but near the end of the tourist route, there is a muddy gully coming down from the lake above. The lower end of this muddy gully is banked with concrete to keep the tourist route from overflowing of soft mud. All the specimens of the type series of *S. albidraconis* were found along the concrete bank, from crevices of half-dried mud.

The new specific name "*albidraconis*" is derived from the name of the type cave "Bailong Gong," which means the "Temple of White Dragon" in Chinese.

Sichuanotrechus rhinoceros S. UÉNO, sp. nov.

(Figs. 5–6)

Length: 5.40 mm (from apical margin of clypeus to apices of elytra).

Also very close externally to *S. wani,* only clearly differing from it in the narrow pronotal base and different configuration of elytral bases, but doubtless more closely related to *S. albidraconis* as is definitely indicated by the peculiar modification of aedeagal apical part.

Head as in *S. albidraconis,* but the antennae are longer, reaching apical fifth of elytra. Pronotum widest more in front, at four-fifths from base, and more obviously contracted posteriad, even than in *S. wani*; PW/HW 1.24, PW/PL 0.91 [PL/PW 1.09], PW/PA ca. 1.50, PW/PB 1.50; sides gently arcuate in front but less so in basal two-thirds, rather shallowly sinuate at basal eleventh, and then subparallel for a short distance to hind angles, which do not protrude laterally; apex straight, about as wide as base, PB/PA ca. 1.00; other prothoracic features as in *S. albidraconis.* Elytra largely as in *S. albidraconis,* but widest at about middle and less pointed at the apices, with prehumeral borders more oblique, less arcuate, and not recurved at the anteriormost part; EW/PW 1.81, EL/PL 2.87, EL/EW 1.73; sides moderately bordered and feebly arcuate throughout, rather widely and conjointly rounded at apices; striation and chaetotaxy as in *S. albidraconis*. Ventral surface and legs as in *S. albidraconis*.

Male genital organ closer in conformation to that of *S. albidraconis* than to that of *S. wani*. Aedeagus about three-tenths as long as elytra, a little higher before middle than in *S. albidraconis*, more gradually dilated towards apex, especially in dorsal view, and slightly recurved at the apical part; viewed dorsally, apical part inclined to the right, somewhat asymmetrical, with lateral parts less heavily thickened than in *S. albidraconis*; viewed laterally, apical part obviously higher than in *S. albidraconis* and more rapidly tapered towards the extremity, which forms a relatively large angle; in profile, ventral margin gently emarginate before middle and very slightly convex in apical half. Inner sac as in *S. wani*. Styles as in the other congeners; in the holotype, right style bears four apical setae, while left style bears only three apical setae.

Female unknown.

Type specimen. Holotype: ♂, 3–VI–2006, S. UÉNO leg. Deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Limestone cave called Xiniu Dong, 620 m in altitude, at Tongquan Cun of Tongkou Zhen in Beichuan Xian, northeastern Sichuan, Southwest China.

Notes. This new species has so far been known from a single male taken in a limestone cave lying on the opposite side of the deep wide valley to Bailong Gong Cave, the type locality of *S. albidraconis*. The entrance to the cave is open above a dried stream bed of a gully and leads to a wide fossilized passage formed by collapses of the ceiling. Beyond this section, the cave rapidly descends to a shallow pool of underground water at the bottom, and the steep downgrade is formed by huge dried boulders. The holotype of *S. rhinoceros* was found in a narrow groove just above the water edge, through which seepage water trickles down to the soft mud deposited around the pool of water. We carefully examined the limited wet place at the bottom since the cave was otherwise very dry, but failed in finding out any additional specimens of the trechine beetle.

The new specific name "*rhinoceros*" is derived from the name of the type cave "Xiniu Dong," which means a "rhinoceros cave" in Chinese.

要約

上野俊一：シセンメクラチビゴミムシ属2新種の記載と属基準種の原記載への補遺．—— シセンメクラチビゴミムシ属 *Sichuanotrechus* は，中国四川省北東部の石灰洞から，ただ1点の未熟な雄個体に基づいて昨年，創設されたもので，その実態が十分には判っていなかった．今年の初夏に実施した現地調査で，龙门山地南西部の洞窟に，同属の種の広く分布することが確かめられたが，個体数が少ないうえに，環境条件のよい洞窟も少ないので，かならずしも満足な資料がえられたとはいえない．しかも4カ所の石灰洞から採集されたチビゴミムシ類のどれもが，きわめてよく似た外部形態をもっていて，雌のみによる分類がほとんど不可能に近い．しかし，雄交尾器の分化は驚くほど進んでいて，平通河流域の洞窟2カ所でえられたものと，通口河流域の洞窟2カ所でえられたものとが，別系列に属すること，後者は深い渓谷の両岸で別の種に分化してい

ることなどが明らかになった．いっぽう，平通河流域の洞窟に分布する属基準種は，唯一の基準標本が未熟個体であるため，原記載に不備な点のあることがわかった．それで，まず基準種の補足記載をしたうえで，通口河流域の 2 種を新種として記載した．それぞれの種の学名と既知産地は下記のとおりである．

Sichuanotrechus wani DEUVE, 2005 —— 四川省北川县桂溪乡永城村，猿王洞；同金宝村，凉水洞；（基準産地は甘溪付近の "Yuan Dong" だと指定されているが，この名の洞窟は村人にも知られていないし，原記載の記述に現地の状況と合わない点が多すぎるので，現時点では特定できない．

Sichuanotrechus albidraconis S. UÉNO, sp. nov. —— 四川省江油市含増镇响石村，白龙宫．

Sichuanotrechus rhinoceros S. UÉNO, sp. nov. —— 四川省北川县通口镇通泉村， 犀牛洞．

なお，この属のチビゴミムシ類の雄交尾器中央片の背面に，肥厚した皮膚に囲まれた細長い窓が開いていることは，ほかのチビゴミムシ類に例をみない，きわめて顕著な特徴である．

References

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